

Nine areas have been charted during the month. Most of these proved to be very violent storms on the lakes and Atlantic coast. With the exception of numbers i., iv., and ix., they have developed within the limits of the chart. Number iii. was the severest storm occurring during November, both on the lakes and the Atlantic coast. Number viii. was especially severe on the lower lakes.

I.—This area first made its appearance in the Saskatchewan valley on the morning of the 4th. During that day the cloudiness increased in the upper lake region, Mississippi and Missouri valleys with light local rains in those districts. On the morning of the 5th the centre was north of Minnesota, and general rains reported from the districts previously mentioned. The winds on the lakes had increased considerably in force. At midnight of the 5th the depression was central over eastern Michigan, having, up to this report, pursued a southeasterly direction. The rain area embraced Tennessee and the Ohio valley, lake region and Mississippi valley. After this report the disturbance changed its course to a northeasterly direction, moving with greater rapidity, accompanied by high winds on the lower lakes, and at the morning report of the 6th it was central east of the Georgian bay. On the 7th the centre was over the Gulf of Saint Lawrence, and the area passed beyond the limits of the chart on that date. Light rains fell in the middle, south Atlantic, and New England states, and high westerly winds prevailed on the Atlantic coast. The lowest barometer reading observed was 29.50 at Saugeen, Canada, on the 6th.

II.—This area developed in Kansas during the afternoon of the 8th. At that report the barometer had fallen considerably, the pressure being .52 of an inch below the normal at Leavenworth, Kansas, where light rain had fallen. Moving in a northeasterly direction, accompanied by rain, this depression was central on the morning of the 9th over eastern Michigan. During the 9th it increased somewhat in energy, the winds on the lower lakes blowing strongly from the west. Passing over the St. Lawrence valley and northern Maine, the area was central on the 10th over the Gulf of St. Lawrence, on which date it passed beyond observation. Rain fell in all districts north of the Gulf and south Atlantic states. The lowest barometer observed was 29.39 inches at Toronto, Canada, on the 9th.

III.—This storm proved to be the most violent of the month. Light snow began to fall during the evening of the 10th, in the extreme northwest, and the barometer in that district fell slowly. At the 11 p. m. report of the 10th, the pressure at Moorhead, Minnesota, was .43 of an inch below the normal. After its development, the area increased in energy as it advanced eastward. The morning report of the 11th showed the centre of disturbance was over Lake Superior. The winds on the upper lakes increased in force, and during the day reached a velocity of over fifty miles an hour on Lake Michigan, and, by the evening, became quite violent on the lower lakes—from twenty-six to fifty-five miles per hour. On the 12th the area was central over the lower Saint Lawrence valley, and on that date passed beyond limits of the chart. Westerly gales prevailed on the Atlantic coast during its passage, and were especially severe on the New Jersey coast where the wind reached a velocity as high as sixty-eight miles. Rain and snow fell in all of the northern districts. The movement of translation was very rapid. The lowest barometer observed was 28.42 inches at Anticosti Island, Gulf of Saint Lawrence, on the 12th.

IV.—This weak depression was first observed during the evening of the 12th north of Minnesota. On the morning of the 13th it was central north of Lake Superior. On the 14th it was central over the lower Saint Lawrence valley. Light snow had fallen in the lake region and rain in the middle Atlantic and New England states. After this report it altered its previous southeasterly course to a direction a little north of east, and on the 15th disappeared, passing over Newfoundland.

V.—This area developed in western Kansas during the after-

noon of the 19th. On the 20th it had moved in a northeasterly direction and was central over western Michigan, and during the afternoon passed into British America, north of Lake Superior. This storm had but little energy, but the area of precipitation extended over all districts.

VI.—The barometer, at the morning report of the 21st, showed a marked fall in the western portion of the Indian Territory. During the day the pressure diminished rapidly, and the area, accompanied by rain, moved in a northeasterly direction to eastern Michigan, where it was central at midnight of the 21st. As it approached the lake region, the winds, especially on the lower lakes, increased in force and blew with great violence, reaching a velocity of from forty to forty-eight miles an hour. On the morning of the 22d the disturbance was central north of Rockcliffe, Canada, and continuing its northeasterly course the area passed beyond the limits of observation during the afternoon of the 22d. The lowest barometer observed was 29.28 inches, at Rockcliffe on the 22d.

VII.—The midnight report of the 22d showed that the barometer had fallen slightly in the previous eight hours in the Missouri valley, the pressure at Huron, Dakota, being .44 of an inch below the normal. The depression had but little energy. It advanced in the first eight hours after its development in a direction nearly east, but after reaching the upper Mississippi valley, on the afternoon of the 23d, it altered its course and moved more to the northeast, passing over Lake Superior, and disappearing into British America on the 24th. Light rains fell in the northern districts and light winds prevailed on the lakes during its passage.

VIII.—This depression developed during the evening of the 24th in northern Dakota. The pressure at Bismarck at the midnight report being .60 of an inch below the normal, with a fall in the barometer of .34 of an inch in eight hours. The storm first advanced northeasterly to Manitoba, where it was central on the morning of the 25th. Easterly winds had prevailed in the upper lakes, increasing in force as the disturbance approached that region. The afternoon report of the 25th showed the centre to be over southern Minnesota, the storm having moved in nearly a south-southeasterly direction from Manitoba. At this hour general rains were falling in nearly all districts. The winds on the upper lakes became quite violent, shifting to a westerly direction and blowing with renewed force, owing to the rapid increase in pressure in rear of the storm. The winds on the lower lakes, though not as high as those on the upper lakes, were, however, very dangerous. On the morning of the 26th the centre of disturbance was over the northern portion of lake Michigan, having moved northeasterly from southern Minnesota. The area moved very rapidly after this report and, on the morning of the 27th, was some distance north of the lower Saint Lawrence valley, disappearing on that date. Severe gales occurred on the Atlantic coast during the passage of this depression. The lowest barometer observed was 29.41 at Saint Vincent, Minnesota, on the 25th.

IX.—This depression made its appearance north of Montana at midnight of the 28th. On the morning of the 29th it was central over Dakota. The area moved with great rapidity and, after the morning report of the 29th, increased considerably in energy as it approached the Atlantic, causing high winds on the New England coast. The morning report of the 30th showed the depression to be central over the Saint Lawrence valley, and after midnight of that date it passed into the Atlantic off Nova Scotia. Light rains fell during its passage in the northern districts.

NORTH ATLANTIC STORMS DURING NOVEMBER, 1883.

(Pressure expressed in inches and in millimetres; wind-force by scale of 0—10.)

Chart ii. exhibits the tracks of the principal depressions that have moved over the north Atlantic ocean during November, 1883. The location of the various storm-centres has been approximately determined from reports of observations furnished by agents and captains of ocean steamships and sailing

vessels in the north Atlantic, and from other miscellaneous data received at this office up to December 24th. The observations used are, in general, simultaneous, being taken each day at 7 h. 0 m. a. m., Washington, or 0 h. 8 m. p. m., Greenwich, mean time.

The month of November, 1883, was marked by a succession of strong gales over the north Atlantic, no fewer than thirteen depressions having been sufficiently well defined within the limits of observation to admit of an approximation of their paths. In most of the disturbances shown on the chart the atmospheric depression was very deep; they were closely followed by a rapid increase of pressure in the western quadrants, causing steep gradients for westerly and northwesterly winds, and, as a fact, the hardest gales were from southwest through west to northwest and north. Many vessels arriving at British and at American ports during the last decade of the month showed evidence of the stormy character of the weather, having lost boats, had decks swept, or were otherwise damaged. The storms charted as numbers viii. and ix., which apparently united during the 17th, were the most severe of the month; during the passage of these disturbances the barometer fell below 29.00 (736.6).

The following descriptions refer to the depressions charted:

I.—This was a continuation of a disturbance charted as number vii. on chart ii. for October. At the close of that month the centre of disturbance was near N. 51°, W. 45°. Moving slowly northeastward, the region of least pressure was transferred to about N. 56°, W. 35°, on the 1st, on which date the s. s. "Sardinian," in N. 56° 35', W. 35° 58', reported barometer 29.2 (741.7), wind sw. by s., force 6, cloudy. Vessels to the southward had moderate to strong w. and sw. gales. The s. s. "State of Indiana," in N. 51° 12', W. 37° 14', reported barometer 29.6 (751.8), wind w., force 9, squally; vessels to the northeastward of the "State of Indiana," had ssw. winds of force 6. During the day the storm-centre moved northeastward, and on the 2d it passed beyond the field of observation. The s. s. "Lake Manitoba," in N. 56° 29', W. 20° 10', on the 2d, reported barometer 29.59 (751.6), wind wnw., force 6.

II.—During the 1st an area of low barometer moved over the Canadian Maritime Provinces, and by the 2d the shifting of the wind and the decrease of pressure, reported by vessels west of the fortieth meridian, indicated that the disturbance had passed to the eastward of Newfoundland. Moderate to strong s. and sw. gales prevailed over the region between W. 50° and 40°, and N. 45° and 52°, the lowest reported barometric readings being 29.8 (756.9); whilst an area of moderately high pressures occupied the ocean to the eastward of W. 40° and south of N. 52°. The s. s. "Scandinavian," in N. 52° 08', W. 35° 53', reported on the 2d, 10 a. m., wind light and backing to south, barometer 30.1 (764.5), falling gradually; 5.30 p. m., heavy rain, wind hauling to sw. The disturbance moved northeastward, and on the 3d the region of least pressure was shown to the northward of the fifty-fifth parallel and between W. 25° and 30°. To the westward of the thirty-fifth meridian the winds had shifted to n. and w., attended by a slight increase of pressure, whilst a corresponding decrease of pressure occurred over the region occupied by the high area above referred to. By the morning of the 4th the disturbance was central off the northern coast of Scotland, the pressure having decreased to 29.33 (745.0), and the wind having attained the force of a whole gale. Captain Andersen, of the ship "Festina Lente," anchored on the "Tail of the Bank," Greenock, reported as follows: "November 3d, in the evening it began to blow a gale from the southwest, with heavy rain, and on the morning of the 4th the wind flew round to northwest, blowing a heavy gale, with tremendous squalls of wind, accompanied by rain and hail."

III.—This disturbance probably originated south of Newfoundland on the 3d; on that date the s. s. "Gallia," in N. 44° 04', W. 53° 13', reported barometer 29.96 (761.0), variable winds, mostly easterly, hard squalls and constant rain. During the 3d the depression moved northeastward, and, on the

4th, it was central near N. 48°, W. 43°. The s. s. "Fulda," in N. 48° 08', W. 40° 32', reported barometer 29.73 (755.1), a fall of about .25 inch, wind sse., force 5, heavy rain. The s. s. "State of Georgia," in N. 48° 44', W. 47° 26', reported barometer 29.8 (756.9), wind nne., force 7, weather dark and rainy. Captain Weiss, of the s. s. "Llandaff City," between N. 45° 00', W. 43° 14' and N. 46° 37', W. 38° 04', reported as follows: "November 3d, 13 h. 40 m. (Greenwich mean time), barometer, 30.14 (765.5); the wind, which, during the previous twelve hours, had hauled right round the compass, with almost constant rain, freshened rapidly from wsw., and, at 14 h. 40 m., was at force 7; it blew with that force until 7 h. 24 m. (Greenwich mean time), of the 4th, when it increased to force 9, the barometer having gone down to 29.84 (757.9)." Moving east-northeastward with decreasing pressure, the centre of disturbance was shown near N. 52°, W. 17°, on the 5th. On that date, the s. s. "Germanic," in N. 50° 56', W. 25° 56', reported barometer 29.13 (739.9), wind wnw., force 7; the s. s. "Arizona," in N. 50° 14', W. 17° 10', barometer 29.19 (741.4), wind wsw., force 7, overcast and raining; and the s. s. "British Crown," in N. 52° 03' W. 19° 27', barometer 29.18 (741.2), wind w. by s., force 4. Vessels in the southeast quadrant of this depression reported moderate to fresh southwesterly and westerly gales, with high, confused sea. During the 5th and 6th the disturbance passed eastward over the British Isles.

IV.—This was a depression which moved eastward over the ocean north of the fifty-fifth parallel. Few reports have been received from that region, but observations taken on board the steamships "Lake Huron" and "Buenos Ayrean," indicate the existence of an extensive area of low pressure (below 29.5) which gave moderate to strong westerly gales, especially on the 9th, when the s. s. "Lake Huron," in N. 56° 00', W. 12° 35', reported barometer 29.52 (749.8), wind wnw., force 7, with heavy squalls of hail and snow, and very high sea.

V.—This was probably a continuation of the depression charted as low area i., chart i., of this REVIEW. During the 7th the disturbance passed over the Canadian Maritime Provinces into the Atlantic, and on the following day it was central near N. 44°, W. 60°, the pressure having decreased about .35 inch over that region during the twenty-four hours. The s. s. "General Werder," in N. 43° 54', W. 58° 44', reported barometer 29.55 (750.6), (being a fall of .48 inch since the observation of the 7th), wind se., force 2 to 3, weather cloudy; and the s. s. "Iowa," in N. 42° 20', W. 66° 57', barometer 29.81 (757.2), rising, wind nnw., force 6, overcast. Vessels between W. 55° and 50°, reported pressure ranging from 29.6 (751.8) to 29.8 (756.9), with moderate to fresh se. winds. By the morning of the 9th, the disturbance, having moved in a northeasterly course, was central near N. 48°, W. 50°, in which region the pressure ranged from 29.27 (743.7) to 29.5 (749.3). The s. s. "Lord Gough," in N. 48° 4', W. 48° 47', on the 9th, reported barometer 29.27 (743.4), wind s. by w., force 5; at 6 p. m. (Greenwich mean time), sudden shift of wind to wnw., force 5, barometer 29.19 (741.4); and the s. s. "Arizona," in N. 45° 54' W. 50° 39', barometer 29.31 (744.5), wind sw., force 5. The pressure had increased to the southwestward, and, as the gradient became steeper, the northwesterly winds increased in force. By the morning of the 10th the area of least pressure was transferred to about N. 52°, W. 33°. The s. s. "Greece," in N. 48° 56', W. 30° 53', reported barometer 29.49 (749.0), wind sw., force 5, rain. Captain Pearce also reports: "during this twenty-four hours the wind backed from w. to sse., hauled again to the west and backed again to sw.; at 7 a. m., fog set in which continued until 10 a. m., when the wind hauled to the westward and blew with increased force." The s. s. "Nova Scotian," in N. 50° 38', W. 36° 4', also reported barometer 29.41 (747.0), wind w. by n., force 5, showery. Vessels near the fiftieth parallel and from W. 30° eastward to W. 20°, reported southwesterly and south-southwesterly winds of force 5 to 6, with rain. On the 11th the pressure was least near N. 55°, W. 19°; on that date the s. s. "British Princess," in N. 54° 20', W. 26° 20', reported barometer 29.16 (740.7),

wind wnw., force 7, overcast. Strong westerly gales were reported by vessels on the fiftieth parallel, and between W. 30° and 18°. On the 12th the depression was over the British Isles, where the pressure ranged from 29.7 (754.4) to 29.8 (756.9).

VI.—This was a continuation of a somewhat deep depression which passed over the Maritime Provinces on the morning of the 10th, when the observed pressure was below 29.4 (746.7). During the 10th the south and south-southwest winds which prevailed over the region east of the centre (between W. 60° and 50°) did not attain a greater force than that of 5 to 6 (fresh to strong breeze), owing, probably, to the fact that, as the pressure increased very slowly after the passage of low area v., the barometric gradient to the eastward was of moderate inclination. On the 11th the centre of depression was near N. 50°, W. 41°, the lowest reported barometric readings ranging from 29.43 (747.5) to 29.52 (749.8). As the pressure began to increase in the region west of the centre, the westerly and northwesterly winds increased in force, but the southerly winds in the eastern quadrants remained moderate in force. On the 12th a great decrease of pressure appears to have occurred, the region of low barometer extending from W. 40° eastward to W. 20°; within this extensive area the lowest readings were as follows: s. s. "British Crown," in N. 53° 26', W. 30° 00', barometer 28.82 (732.0), wind wsw., force 2; s. s. "Denmark," in N. 49° 00', W. 32° 50', barometer 28.93 (734.8), wind wsw., force 5, cloudy and threatening; s. s. "Habsburg," in N. 49° 07', W. 32° 48', barometer 28.93 (734.8), wind sw., force 6, fair; s. s. "Elbe," in N. 49° 24', W. 30° 00', barometer 29.00 (736.6), wind wsw., force 6-7, overcast, squally; s. s. "Greece," in N. 47° 40', W. 38° 49', barometer 29.18 (741.2), wind n., force 8; s. s. "Lord Gough," in N. 51° 00', W. 26° 04', barometer 29.07 (738.4), wind s. by e., force 7, raining. Moderate southerly gales were experienced by vessels between N. 48° and 52°, and from W. 27° eastward to W. 15°, while moderate to strong northerly and westerly gales, with hurricane-like squalls, prevailed in the western quadrants. During the 12th the disturbance appears to have moved by a course slightly south of east, the direction of the wind on the 13th indicating that the depression was near N. 51°, W. 17°. The pressure had increased to 29.5 (749.3), and the winds between W. 30° and 10° had decreased in force; to the westward of the thirtieth meridian, however, the wind changed from west to south and blew with the force of a moderate to strong gale in advance of a deep depression then moving northeastward from the Gulf of Saint Lawrence. During the 13th the depression apparently filled up, the reports of the following day showing a considerable increase of pressure over the British Isles and the ocean westward to W. 18°.

VII.—This is a continuation of the track of low-area iii., chart i. It passed as a severe storm over the Maritime Provinces during the 12th, the lowest observed barometer at land stations being 28.8 (731.5). During its passage over the Gulf of Saint Lawrence it caused strong southeasterly to southwesterly gales, which, on the 13th, changed to northerly and northwesterly, and continued to blow with great force. Captain James Scott, of the s. s. "Buenos Ayrean," reported as follows: "12th, off Cape Chatte, Gulf of Saint Lawrence, noon, strong and increasing breeze from w. by s., with heavy snow; 8.30 p. m., wind freshened from same direction to gale with heavy snow, heavy sea getting up; 10.30 p. m., strong gale from w. by s., with blinding snow squalls and very heavy sea running; 12.30 a. m., gale moderating a little and snow squalls taking off." Strong northwesterly gales also occurred off the coasts of the New England and middle Atlantic states, causing much damage to coasting vessels. On the 13th the pressure was least near the Straits of Belle Isle, the s. s. "Oregon," in N. 52° 27', W. 53° 00', reporting barometer 28.41 (721.6), wind w., force 6, cloudy. Captain Williams reported as follows: "13th, midnight, snow and hailstorm from sse. At 3 a. m., same date, the wind shifted to the westward, lowest reading of the barometer at 2 a. m., 28.4 (721.3), electric light on all the masts and yards; noon, barometer 28.46 (722.9).

Vessels between W. 50° and 40° and N. 45° and 52° reported pressures ranging from 28.9 (734.0) to 29.1 (739.1), with very heavy southerly gales, furious squalls and high sea. Those to the southward of N. 45° encountered very heavy westerly and southwesterly gales, the s. s. "Lydian Monarch," in N. 44° 40', W. 56° 08', reporting a hard wsw. gale, in which she carried away the starboard rail and lost a life-boat. The brig "Rise and Shine," in N. 44°, W. 52°, had decks swept and lost sails. S. s. "Greece," W. Pearce commanding, in N. 46° 53', W. 43° 29', reported as follows: "13th, 1.30 a. m., wind backed to the sw.; 6.00 a. m., barometer 29.59 (751.6), wind se., increasing in force to heavy gale, passing showers of thick rain; 8.00 a. m., barometer 29.04 (737.6), wind se., strong gale, and passing showers of thick rain; 10.00 a. m., wind hauling to s. and decreasing in force, barometer 29.02 (737.1); 11.00 a. m., wind came suddenly from nw., heavy squalls, with hail."

The following reports indicate the severity of the storm during the 12th and 13th: s. s. "Hohenstaufen," Th. Yüngst commanding, 12th, in about N. 43° 04', W. 58° 33' from noon to 10.00 p. m. the barometer fell from 29.63 (752.6) to 29.14 (740.1), strong gale with heavy rain and hail squalls, wind shifting from s. to sw., and afterwards to wnw., with a force of 9 to 10, high, irregular sea from w. and wnw; 13th, 6 a. m., barometer 29.11 (739.4), very heavy storm from nw., force 10, with heavy rain and hail. S. s. "Bothnia," H. McKay commanding, in N. 42° 20', W. 59° 00', to N. 41° 40', W. 62° 23', reported as follows: "12th, noon, continuous rain, wind se., force 6, barometer 29.7 (754.4); 4 p. m., wind s. 42 w., force 6, barometer 29.26 (743.2); 8 p. m., wind n. 87 w., force 6, barometer 29.21 (741.9); midnight, wind n. 87 w., force 8, barometer 29.26 (743.2); 13th, 4 a. m., wind n. 87 w., force 9, barometer 29.26 (743.2), fierce squalls with high head sea; 8 a. m., wind n. 87 w., force 10, barometer 29.19 (741.4), heavy gale, with terrific squalls of hurricane force attended by hail and snow, high, mountainous sea." S. s. "Lord Clive," P. Urquhart commanding: "12th, noon, ship's time, N. 44° 46', W. 55° 30', barometer 29.73 (755.1), fresh sse. wind; 4 p. m., N. 44° 23', W. 56° 16', barometer 29.34 (745.2), ssw. gale with rain; 8 p. m., barometer 29.27 (743.4), sw. gale; midnight, barometer 29.27 (743.4), wind sw., blowing a hurricane with terrific hail, rain, and snow squalls, sea high; 4 a. m., barometer 29.25 (742.9), weather the same, sea very high; 8 a. m., barometer 29.25 (742.9), weather the same; 13th, noon, N. 43° 15' W. 57° 55', barometer 29.40 (746.7), wind and squalls the same; 1 p. m., beginning to moderate, and continuing to do so until noon of the 14th, barometer 30.1 (764.5), wind back to sw., moderate, sea going down." S. s. "Rugia," A. Albers commanding: "13th, 4 p. m. (Greenwich time), N. 42° 40', W. 58° 00', wind increasing from sse. with rain; 8 p. m., barometer 29.27 (743.4), wind w., increasing to a violent gale, furious hail squalls, sea running very high and irregular and breaking from sw., w., and wnw; on the 14th, 8 p. m., storm decreasing, but still a high and breaking sea from sw. by w.; ship's position at 4 p. m. of the 14th, N. 41° 16', W. 60° 09'."

The reports of the 14th indicate that the disturbance moved north-northeastward beyond the fifty-fifth parallel. A slight increase of pressure occurred over the region south of 50°, north latitude, and the westerly winds increased to almost hurricane force. This depression apparently moved beyond the field of observation before reaching the fortieth meridian.

VIII.—The marine reports at hand indicate that this disturbance and that charted as ix., which apparently united with it, were the most severe storms of the month; and that they far exceeded in violence the usual November gales. Number viii. was probably a continuation of low area iv., of chart i.; passing over the Maritime Provinces and the Gulf of Saint Lawrence as a shallow depression on the 14th, the centre of disturbance reached N. 52°, W. 45°, on the 15th. On that date the s. s. "British Prince," in N. 50° 20', W. 42° 40', reported barometer 29.63 (752.6), wind ssw., force 8. To the southward and westward, the pressure ranged from 29.8 (756.9)

to 30.1 (764.5), and moderate to strong southerly gales were reported by vessels between W. 50° and 40°. On the 16th the centre of disturbance was not well-defined, owing to the absence of reports from the region north of 55°, north latitude, but was probably near N. 55°, W. 40°. South of N. 50°, and between W. 40° and 30°, the barometric readings were high, and moderate westerly and northwesterly gales prevailed, while between W. 30° and 20° strong southwesterly winds were reported. S. s. "Oregon," H. C. Williams commanding, in N. 56° 34', W. 30° 45', reports as follows: "16th, 1 a. m., lowest reading of the barometer 29.00 (736.6), winds continually oscillating from w. to sw., wind and sea furious." On the 17th the storm-centre was near N. 54°, W. 34°, the s. s. "Polaria," in N. 53° 58', W. 34° 40', reported having experienced a hurricane on the 17th; the wind subsided to nearly a calm, but in a short time it came out from wsw. with terrific force, the sea being in a perfect foam; soon after this the barometer began to rise, but the sea rose to a fearful height, completely washing over the vessel. On the 18th the region of least pressure was near N. 56°, W. 18°, where this depression became merged in low area ix., displaying all the violence which characterized the latter depression during its earlier movements; the course of number viii. after the 17th, is hereafter described in connection with depression number ix.

IX.—During the night of the 15-16th a slight depression passed east-southeastward over southern Quebec and northern Maine, and by the morning of the 16th it was central south of Nova Scotia, the lowest reported barometer being 29.77 (756.1). The winds shifted to east and southeast over the region from W. 65° eastward to W. 50° and blew with the force of a strong gale; as the pressure rapidly increased in rear of the depression, very strong northwesterly gales occurred along the coasts of the United States as far south as N. 33°. The disturbance moved rapidly northeastward, attended by decreasing pressure, the barometric readings on the 17th being below 29.0 (736.6) near N. 45°, W. 43°. Steep gradients were formed in rear of the depression, and the northerly and northwesterly winds attained hurricane force. The following extracts serve to indicate the extreme violence of this storm: Captain Buschmann, of the s. s. "Zeeland," in about N. 47° 10', W. 42° 05', reported: "November 17th begins with strong, unsteady se. wind and rising sea, barometer 29.6 (751.8); 7 a. m. (Greenwich mean time), wind and sea increasing and barometer falling to 29.4 (746.7); 9 a. m., strong gale, wind hauling to southwest, barometer falling to 29.2 (741.7); 11 a. m., strong, increasing gale and high sea, wind veering to wsw., barometer 29.12 (739.6). From noon to 2 p. m., hurricane from wsw. to wnw., sea running very high, ship hove to, with cloth in the mizzen rigging, barometer 28.9 (734.0); 3 p. m., wind nw., heavy gale and high, confused sea, sky breaking up and barometer rising to 29.14 (740.1); 6 p. m., wind and sea decreasing, barometer 29.6 (751.8)." Captain Frangeul, of the French s. s. "Canada," reported 17th: "From 8 a. m. to 2 p. m. terrific sw. gale, with squalls from ssw. at 3 o'clock, and a sudden and rapid fall of the barometer of about .28 inch per hour, for two and a half hours. In N. 48° 18', W. 40° 57', the barometer read 29.03 (737.3), wind sw., force 8, cloudy." Captain Myer, of the bark "Heinrich and Tonio," reported on the 16th and 17th, in N. 41° 21', W. 64° 30', wind se., thick, rainy weather until 10 a. m.; wind then moderated and hauled to nw., with clearing weather; it afterwards blew a heavy nw. gale, with snow and hail-squalls, lasting fourteen hours.

Captain Park, of the s. s. "Scandinavian," in N. 44° 11', W. 56° 40', reported: "16th, wind increasing to a gale from the eastward, with high sea; 4 p. m., fresh e. gale and cloudy; 9 p. m., wind veered suddenly to ssw., and gradually to w., lowest barometer 29.19 (741.4); 17th, 3 a. m., wind flew suddenly into nw., with lightning and squalls, and increased to a heavy gale, with high, dangerous sea; rounded the ship to; 11 a. m., gale moderating, kept off to course; remainder moderate, with snow-squalls and heavy cross sea, barometer rising."

Captain Watkins, of the s. s. "City of Berlin," forwards the following:

Changes of the wind, barometer, &c., for the 24 hours beginning noon the 16th of November, ending noon the 17th.

| Hour. | Barometer. | Wind. | | Weather. |
|-------------|------------|------------|----------------|---|
| | | Direction. | Force, (0-12.) | |
| Noon..... | 30.11 | east. | 2 | Partly cloudy. |
| 2..... | 30.05 | east. | 2 | Do. |
| 4..... | 29.95 | east. | 4 | Overcast. |
| 6..... | 29.79 | east. | 7 | Overcast and rain. |
| 8..... | 29.45 | se. | 8 | Do. |
| 10..... | 29.26 | wsu. | 8 | Do. |
| 12..... | 29.25 | wsu. | 8 | Overcast. |
| 2 a. m..... | 29.12 | wsu. | 9 | Do. |
| 4..... | 28.95 | west. | 10 | Overcast, with violent squalls. |
| 6..... | 29.33 | nw. | 11 | Overcast, with violent squalls of hail and sleet. |
| 8..... | 29.72 | nw. | 10 | Do. |
| 10..... | 29.95 | nw. | 9 | Do. |
| 12..... | 30.09 | nw. | 8 | Do. |

Lat. noon the 16th, 46° 04', long. 47° 07'; lat. noon 17th, 45° 02', long. 52° 21' W.

Captain Willigerod, of the s. s. "Elbe," furnishes the following:

| Local time. | Barometer. | | Wind. | | Remarks. |
|-----------------|------------|-------|------------|----------------|--|
| | Inches. | Mill. | Direction. | Force, (0-10.) | |
| November 16. | | | | | |
| Noon..... | 29.91 | 759.7 | se. | 6 | Ship's position N. 43° 50', W. 56° 46'. |
| 4.00 p. m..... | 29.30 | 744.3 | se.-e. | 8 | Ship's position N. 43° 26', W. 58° 5'. Wind fell light for a short time and suddenly shifted to sw. and w.; increasing wind and sea; threatening appearance. |
| 8.00 p. m..... | 29.38 | 746.1 | sw. | 8-9 | N. 43° 10', W. 58° 55'; heavy squalls with rain; terrible sea. |
| 9.30 p. m..... | 29.09 | 738.8 | sw. | 10 | Wind blew with hurricane force from sw. hauling to nw.; ship laboring heavily and shipping much water; sea surface all foam and spray. |
| 10.00 p. m..... | 29.15 | 740.3 | nw. | 10 | Tremendous sea. |
| 10.30 p. m..... | 29.42 | 747.3 | nw. | 10 | Ship covered with foam and spray; unable to see twenty feet ahead. |
| 11.00 p. m..... | 29.64 | 752.8 | n. | 10 | Confused sea from all directions; ship laboring fearfully. |
| 11.30 p. m..... | 29.72 | 754.8 | nne. | 8 | Decreasing wind and sea; blowing in squalls with hail and rain. |
| Midnight..... | | | n. | 8-7 | Moderating. |
| November 17. | | | | | |
| 4.00 a. m..... | 30.22 | 767.6 | n. | 5 | High nw. swell. |

Captain Hellmers, of the s. s. "Habsburg," reported as under:

| Ship's apparent time. | Barometer. | | Temperature. | | Wind. | | Remarks. |
|-----------------------|------------|-------|--------------|-------|------------|---------------|---|
| | Inches. | Mill. | Fahr. | Cent. | Direction. | Force (0-10.) | |
| 17th, 0.00 a. m. | | | 0 | 0 | | | N. 44° 49', W. 53° 07'. |
| " 1 " | 29.13 | 739.9 | 48.2 | 9.0 | wsu-sws | 6-8 | |
| " 2 " | 29.04 | 737.6 | 46.4 | 8.0 | s. | 7-8 | |
| " 3 " | 29.02 | 737.1 | 41.9 | 5.5 | s. | 8-9 | |
| " 4 " | 29.06 | 738.1 | 39.2 | 4.0 | w; nw by n | 9-10 | At 2.50 wind flying round from s. (force 8-9) to w. (force 8-9). |
| " 5 " | 29.29 | 744.0 | 33.8 | 1.0 | nw. by n. | 10 | At 3.10 from w., 9, to nw. by n., 10. A very heavy, dangerous sea; ship drifting bodily to leeward. |
| " 6 " | 29.48 | 748.8 | 35.6 | 2.0 | nw. by n. | 10 | |
| " 7 " | 29.86 | 758.4 | | | nw. by n. | 9 | |
| " 8 " | 29.96 | 761.0 | 32.0 | 0 | nw. by n. | 9 | |
| " 9 " | 30.08 | 764.0 | 31.1 | -0.5 | nw. by n. | 9 | |
| " 10 " | 30.09 | 764.3 | 32.0 | 0 | nw. by n. | 8 | |
| " 11 " | 30.10 | 764.5 | 33.8 | 1.0 | nw. by n. | 8 | |
| Noon..... | 30.22 | 767.6 | | | nw. by w. | 7 | Latitude at noon, by observation, N. 44° 39', W. 54° 01'. |

Captain McMickan, commanding the s. s. "Gallia," between N. 41° 35', W. 58° 37', and N. 43° 19', W. 50° 40', reported as follows:

| | Barometer. | | Wind. | Remarks. |
|-------------------|------------|-------|-------|--|
| | Inches. | Mill. | | |
| 16th, noon..... | 29.59 | 751.6 | eno. | Fresh gale; high, confused sea; raining. |
| " 2 p. m..... | 29.38 | 746.2 | sw. | 1.00; shift of wind to sw., increasing to a gale. |
| " 4 p. m..... | 29.40 | 746.7 | wsu. | Strong gale; dark, gloomy weather; high sea. |
| " 8 p. m..... | 29.50 | 749.3 | wsu. | Strong gale; hard squalls and rain. |
| Midnight..... | 29.47 | 748.5 | wsu. | Strong gale; hard squalls and rain. |
| 17th, 2 a. m..... | 29.40 | 746.7 | | Barometer fluctuating. |
| " 4 a. m..... | 29.45 | 748.0 | | Barometer rising; furious gale; violent squalls; rain and sleet. |
| " 8 a. m..... | 29.90 | 759.4 | | Wind and sea moderating; squalls less severe. |
| " noon..... | 30.14 | 765.4 | | Wind veering to nw.; finer weather; high wsw. sea. |

Captain Tyson, of the s. s. "Denmark," reported N. 45° 20', W. 50° 30', "17th, 1 a. m., barometer 28.93 (734.8), wind sw. thence to wsw., force 7; 9.30 a. m., sudden shift to nw., and increased to force 10, with terrific squalls of snow, hail, and sleet, and high sea, lasting six hours." Captain Freeth, of the s. s. "British Prince," in N. 47° 14', W. 50° 50', reported, "17th, 11 a. m., wind shifted from wsw. to ne., and blew a hurricane for five hours, with hail and snow storm; high cross sea running." S. s. "Greece," W. Pearce commanding, between N. 44° 13', W. 53° 53', and N. 42° 35', W. 56° 59', on the 16th and 17th, reported as follows: "17th, p. m., barometer 30.18 (766.6), wind increasing from the e. by n.; 5 p. m., wind hauled to the sw., barometer 29.48 (748.8); midnight, wind increased to a hurricane, barometer 29.18 (741.2); 0.45 a. m., wind hauled to n., and the barometer rose rapidly; 2 a. m., barometer 29.53 (750.0), hurricane continued to abate, and by 8 a. m. the barometer stood at 30.18 (766.6); at 7.30 passed a quantity of wreckage."

Captain McNay, commanding the s. s. "Pavonia," reported as follows: "16th, in N. 46°, W. 40°, 6 p. m., the wind came out in a light breeze, with overcast sky, and dark, inky clouds passing; 8 p. m., the wind veered east, moderate breeze and rainy weather, barometer 29.96 (761.0); 10 p. m., wind s., began to freshen, barometer falling rapidly and the sky assuming a threatening appearance; midnight, strong and rapidly increasing sw. wind, with dark, cloudy sky and rising wsw. sea, heavy squalls and showers of rain. 17th, 4 a. m., hard gale from sw., with squalls of hurricane force, the sea becoming perfectly white with foam; noon, latitude 45° 30' N., longitude 43° 27' W., still a violent gale, with very high sea, dark cloudy sky and fierce squalls, barometer 29.23 (742.4), wind veering to w. by s.; 1 p. m., barometer 29.29 (744.0), beginning to rise rapidly, but still no lull in the gale. The wind, still veering, caused the sea to rise to an extraordinary height, becoming cross and very rough; 2 p. m., wind nnw., moderating somewhat, barometer 30.13 (765.3) and still rising, the sky occasionally clear, squalls of sleet and snow, the temperature falling considerably; 6 p. m., weather still moderating, with less sea, barometer 30.39 (771.9)."

Captain Woolfenden, of the s. s. "Samaria," reported: "17th, 2.55 a. m., barometer 29.22 (742.2), wind ssw., fresh gale and overcast sky, with heavy rain, which continued up to 8.30 p. m.; in N. 44° 15', W. 47° 10', barometer 29.04 (737.6), when the wind veered to w. by s. and increased suddenly to a furious gale, sky heavily overcast, and very heavy sea running; 10.30 a. m., still blowing furiously, barometer 29.12 (739.6), sky clearing in the northwest; noon, gale moderating, barometer 29.24 (742.7), wind veering."

Captain Pitt, of the s. s. "Virginian," in about N. 45° 47', W. 46° 00', reported: wind sw., heavy gale, lowest barometer 29.20 (741.7), then sudden shift from sw. to nw., with very heavy rain, wind force 10.

Most of the above reports show the rapid increase of pressure which occurred after the wind had shifted to the northward, especially the reports of the "Pavonia," "Elbe," and "City of Berlin." Much wreckage was passed by some of the above vessels, and recent cable dispatches (December 27th) seem to indicate that the s. s. "Plantyn" was disabled and abandoned during this gale, that vessel having encountered the hurricane on the 17th in N. 44° 17', W. 42° 20', when boats, deck-houses, &c., were carried away, engine-room flooded, &c.

By the 18th the depression had apparently united with low area viii., the region of least pressure on that day being near N. 57°, W. 18°. To the westward of the thirtieth meridian the pressure continued to increase, the barometer readings ranging from 30.40 (772.1) to 29.9 (759.4), while northerly and northwesterly winds, of hurricane force, still prevailed to the westward of W. 25°. In N. 52°, W. 25°, to W. 12°, the pressure was about 29.8 (756.9), and strong westerly gales were reported.

Captain William, of the s. s. "Oregon," which vessel was between N. 56° 20', W. 22° 53', and N. 55° 57', W. 18° 10',

from the 16th to 17th, reported as follows: "November 18th, 2 a. m., lowest reading of the barometer 28.8 (731.5), wind s. (true), blowing a perfect hurricane, split fore and aft sails; brought the ship head on to the sea; at 4 a. m. the wind shifted to the westward, and from that time until midnight the sea was perfectly frightful. A long mountain of a roll from the w., with a sea from s. rolling the tops of the waves into sugar-loaf heaps and boarding the ship in every direction. At midnight, wore ship and resumed course, carrying a long, heavy swell from the w., with heavy hail squalls all the rest of the passage into the north channel."

The s. s. "British Crown," R. Wills commanding, experienced a furious westerly gale in about N. 52°, W. 19°, carrying away starboard life-boat; the barometer at the simultaneous observation of the 18th read 29.67 (753.6). The s. s. "Devonia," in N. 55° 20', W. 12° 38', on the 18th reported barometer 29.42 (747.3), wind w., force 8, heavy squalls, with hail and rain; and the s. s. "State of Indiana," in N. 55° 22', W. 9° 00', barometer 29.3 (744.2), wind w., force 7. The s. s. "Minerva," in N. 50°, W. 22°, during the 17th and 18th encountered a terrific hurricane from sw. to nw., lasting twelve hours, and sustained damage to decks. On the 19th the disturbance, having moved slowly during the preceding twenty-four hours, was north of Scotland, causing strong gales over the British Isles and the English Channel. Heavy westerly and northwesterly gales continued over the ocean east of W. 40° from the 19th to 23d, the pressure remaining low to the north and northwest of the British Isles, while a region of high pressures occupied the ocean south of N. 52° and west of W. 15°.

X.—During the 23d the pressure began to decrease over the ocean between W. 20° and 40°, and by the 24th the pressure was least near N. 54° W. 30°, where the barometer read 28.6 (726.4). West of the fortieth meridian strong northwesterly gales prevailed, the barometric readings ranging from 29.5 (749.3) to 30.1 (764.5). The following are the reports of vessels which encountered the storm: s. s. "State of Indiana," J. H. Sadler commanding, in N. 52° 54', W. 31° 30', on the 24th reported barometer 28.6 (726.4), wind wnw., force 7, raining. S. s. "State of Georgia," G. Moodie commanding, reported, "November 24th, N. 56° 6', W. 16° 30', 0.8 p. m., Greenwich mean time, thick, blinding rain, wind coming in gusts and lulling again; at 3 p. m. wind fell light and veered to about S. 45° W., and the rain cleared away; large black masses of clouds were driven away to the eastward; force of wind about 5 to 6, sea moderately smooth, only a slight swell from S. 66° W., sky partially clear, with showers of rain at times." The following are the readings of the two aneroids:

| Time. | Barometer. | | Time. | Barometer. | |
|-------------|------------|-------|-------------|------------|-------|
| | Inches. | Mill. | | Inches. | Mill. |
| 3.55 p. m. | 28.74 | 730.0 | 16.00 a. m. | 28.44 | 722.4 |
| 4.15 p. m. | 28.70 | 729.0 | 17.00 a. m. | 28.42 | 721.9 |
| 6.00 p. m. | 28.67 | 728.2 | 18.00 a. m. | 28.42 | 721.9 |
| 8.00 p. m. | 28.65 | 727.7 | 18.30 a. m. | 28.43 | 722.1 |
| 11.00 p. m. | 28.58 | 725.9 | 20.00 a. m. | 28.40 | 722.9 |
| 12.00 p. m. | 28.56 | 725.4 | | | |

S. s. "Waesland," H. Nickels commanding, reported: "November 23d, in N. 50° 18', W. 26° 30', at 15 hours, Greenwich mean time, moderate sw. gale veering gradually to w., with drizzling rain, barometer 29.56 (750.8), wind increasing in force. At noon, November 24th, blowing a violent gale, with a succession of squalls of hurricane force; ship's position at noon, N. 50° 18', W. 28° 04', barometer 29.31 (744.5), still falling. November 24th, 8 h's 30 m., Greenwich mean time, in N. 50° 18', W. 28° 20', barometer 29.21 (741.9), wind nw. by w., force 10; terrific rain and hail squalls, with tremendous sea running and breaking on deck with great force; ship's head to the wind on the starboard tack; engine slowed down. Towards midnight wind blowing almost a hurricane, causing a fearful sea, which smashed and displaced boats, stove in the pilot-

house and sky-lights, and did other damage around the decks; at 23 h's wind moderating a little, barometer rising."

S. s. "Daniel Steinmann," H. Schoonhoven commanding, between N. 49° 34', W. 26° 27', and N. 48° 54', W. 30° 33', reported as follows: "24th, 3 a. m., wind w. by s., force 8, barometer 29.52 (749.8); 10 a. m., wind w. $\frac{1}{2}$ n., force 10; 2 p. m., wind w. by n., force 10, barometer 29.38 (746.2); 5 p. m., wind same force and direction, accompanied by blinding hail and rain till 9 p. m., fearful westerly sea, with hurricane squalls; 11 p. m., barometer 29.28 (743.7); 25th, 3 a. m., wind wnw., force 10, barometer 29.33 (745.0); 10 a. m., squalls less furious, barometer 29.38 (746.2); 2 p. m., wind wnw., force 9, barometer 29.56 (750.8); after that the wind blew a moderate gale, with steadily rising barometer; 6 p. m., wind nw. by w., force 5, barometer 29.68 (753.9)."

S. s. "Llandaff City," T. L. Weiss commanding, furnishes the following:

| Date. | Greenwich time. | Barometer. | | Wind. | | Latitude N. | Longitude W. |
|-------|-----------------|------------|-------|-------|-------|-------------|--------------|
| | | Inches. | Mill. | Dir. | Force | | |
| 24 | 17 12 | 28.92 | 734.6 | sw. | 7 | 51° 06' | 17° 54' |
| 24 | 21 14 | 28.84 | 732.5 | w. | 7 | | |
| 24 | 23 15 | 28.78 | 731.0 | w. | 7 | | |
| 25 | 4 45 | 28.65 | 727.7 | w. | 6 | | |
| 25 | 9 18 | 28.70 | 727.9 | nw. | 7 | | |
| 25 | 11 19 | 28.80 | 731.5 | wnw. | 7 | 51° 01' | 20° 34' |
| 25 | 13 20 | 28.82 | 732.0 | n. | 7 | | |
| 25 | 15 21 | 28.95 | 735.3 | wnw. | 7 | | |
| 25 | 17 22 | 29.08 | 738.6 | nw. | 7 | | |
| 25 | 19 23 | 29.22 | 742.2 | nw. | 6 | | |
| 25 | 21 26 | 29.30 | 744.2 | nw. | 6 | | |
| 25 | 23 28 | 29.35 | 745.5 | nw. | 7 | 50° 41' | 22° 20' |

This depression was very extensive, the pressure being below 29.00 (736.6) over the region from W. 15° to W. 32°, and to the north of 52° north latitude; vessels on that parallel reported barometer 29.0 (736.6) to 29.1 (739.1). On the 25th the region of least pressure was to the northwest of Ireland, and was indicated by the isobar for 28.5 (723.9), while to the westward, as far as the twenty-third meridian, and southward to N. 49°, the pressure ranged from 28.7 (729.0) to 28.9 (734.0). The following reports are given: s. s. "Ohio," G. Meyer commanding, in N. 48° 11', W. 7° 14', reported:

| | Barometer. | | Wind. | | Remarks. |
|------------|------------|-------|-------|--------|---|
| | Inches. | Mill. | Dir. | Force. | |
| Nov. 25th. | | | | | |
| 3 a. m. | 29.15 | 740.4 | sw. | 7 | Stormy weather, covered, mostly rain, and very heavy sea swell from nw. |
| 4 a. m. | 29.15 | 740.4 | sw. | 7 | |
| 6 a. m. | 29.13 | 739.9 | sw. | 6 | |
| 4 p. m. | 29.14 | 740.1 | sw. | 7 | |
| Midnight. | 29.18 | 741.2 | wnw. | 8 | |

S. s. "Circassian," W. H. Smith, R. N. R., commanding, reports: "25th, a. m., moderate breezes, with frequent showers and smooth water, wind nw., force 3; at 5 a. m., Greenwich mean time, latitude 54°, 55' N., longitude 17° 10' W., barometer, lowest reading, 28.56 (725.4), wind shifted to the ne. and freshened, barometer rising. At noon strong and increasing gales, with heavy sea, wind backing to the northward; midnight, wind nw., strong gales, with heavy squalls and high sea." S. s. "Westphalia," F. Bornmüller commanding, reported in N. 49° 53', W. 11° 21', on the 25th, barometer 28.7 (729.0), wind n., force 6, raining; s. s. "Pennsylvania," G. C. Dodge commanding, reported, 25th, in N. 50° 53', W. 21° 56', barometer 28.91 (734.3), wind n., force 7, cloudy; s. s. "Holland," J. Milligan commanding, 25th, in N. 49° 17', W. 22° 25', barometer 28.97 (735.8), wind wnw., force 9, cloudy; and the s. s. "Germanic," C. W. Kennedy commanding, 25th, in N. 51° 16', W. 10° 45', barometer 28.63 (727.2), wind wsw., force 7, showery.

From the twenty-fifth meridian westward to W. 40°, strong northwesterly and northerly gales prevailed, with pressure ranging from 29.2 (741.7) to 29.9 (759.4).

XI.—On the 25th there was a decrease of pressure off the coast of Nova Scotia. Moving east-northeastward, attended by rapidly decreasing pressure, the storm-centre became well-defined in about N. 50°, W. 38°, on the 26th, on which date the pressure at the centre was 28.7 (729.0). The s. s. "State of Indiana," in N. 49° 38', W. 39° 00', reported barometer 28.7 (729.0), wind ene., force 10, heavy rain; and s. s. "Republic," in N. 49° 24', W. 37° 40', barometer 28.84 (732.5), wind wsw., force 6, squalls.

Captain Willigerod, of the s. s. "Elbe," furnishes the following report:

| Date. | Barometer. | | Wind. | | Remarks. |
|------------------|------------|-------|--------|--------|--|
| | Inches. | Mill. | Dir. | Force. | |
| Nov. 26, 8 a. m. | 29.06 | 738.0 | sw. | 8-9 | Wind fell light, hauling to s. and se. |
| " " noon. | 28.85 | 733.9 | se.-e. | light | High swell from ssw., wnw., ne.; constantly raining. (Position, N. 47° 48', W. 39° 13'.) |
| " " 2 p. m. | 28.82 | 732.0 | n. | 8 | Squally; clearing in nw. horizon. |
| " " 4 p. m. | 28.85 | 732.7 | | | Moderate gale; high ssw. swell. |
| " " 8 p. m. | 28.94 | 735.1 | nnw. | 8-10 | Blowing hard in squalls; hail and rain. |
| Midnight. | 29.08 | 738.5 | nnw. | 8-10 | |
| Nov. 27, 4 a. m. | 29.10 | 739.1 | nnw. | 8-10 | Blowing hard in squalls; tremendous sea; ship working fearfully and shipping much water; after daylight, clearing. |

Captain Irving, of the s. s. "Republic," reported as follows: 26th, 2 a. m. (ship's time, midnight), in N. 49° 50', W. 34° 30', barometer 29.78 (756.4) and falling rapidly, wind light and unsteady from sw.; 6 a. m., barometer 29.38 (746.2), wind se., force 8, constant rain and confused sea; 8 a. m., barometer 29.00 (736.6), wind se., force 9; 9.30 a. m., barometer 28.82 (732.0), wind falling light, with heavy rain, and suddenly shifting to nnw.; 12 m., barometer 28.80 (731.5), confused sea, wind unsteady from nw. to n., and blowing in gusts; 2 p. m., (ship's time, noon), in N. 49° 08', W. 38° 20', barometer 28.80 (731.5), wind light and unsteady from ne.; 4 p. m., wind freshened from ne., and increased; 5 p. m., wind ne., force 10, heavy sea, barometer with a tendency to rise; 8 p. m., barometer 29.12 (739.6), wind ne., force 10, with terrific squalls; 10 p. m., barometer 29.35 (745.5), wind inclining to n., with hard squalls, sky breaking in nw.; 12 p. m., weather clearing, barometer slowly rising, and wind settling into a steady nne. gale, with a heavy sea. Mean temperature throughout, air, 42° (5° 6 C.), sea-water, 53° (11° 7 C.).

Captain H. Nickels, of the s. s. "Waesland," reports: 26th, 9 p. m. (between N. 49° 05', W. 33° 25', and N. 48° 05', W. 38° 15'), a sudden calm and light, variable airs, barometer 28.94 (735.1); 10 p. m., breeze springing up from nne., increasing rapidly in force; midnight, blowing a violent gale, hail squalls, with hurricane force, tremendous sea running and breaking over the ship, rapidly rising barometer; during the forenoon of the 27th the wind and squalls moderated.

West of 45° W. longitude the pressure was from 29.7 (754.4) to 30.0 (762.0), and very strong w. to nw. gales were reported. On the 27th the centre of disturbance was in N. 42°, W. 26°, with heavy s. and ssw. gales to the eastward, and squally, violent n. and nw. gales to the westward. S. s. "Lake Manitoba," P. D. Murray commanding, reported as follows: "27th, 6 a. m. (in N. 54°, W. 26°), barometer 28.35 (720.1), wind ne., fresh, very heavy s. and w. sea; 3 p. m., barometer 28.42 (721.9), wind n., light, confused sea; 10 p. m., moderate wind, wnw.; noon of the 28th, barometer 29.30 (744.2), wind wsw., clear weather, high sw. sea."

Captain Weiss, of the s. s. "Llandaff City," in N. 50° 11', W. 28° 22', reported as follows: "During the past twenty-four hours there has been a great depression of the atmosphere, the barometer falling to 28.70 (729.0) at 12 h. (Greenwich mean time), after which it began to rise rapidly. The wind during the night of the 26th veered from w. to ese., with rain, then hauling back to n., with dirty weather, lightning to the s., se., and ne."

Captain Sander, of the s. s. "Oder," in N. 49° 20', W. 27° 51', reported barometer 28.72 (729.5), wind sw. to n., force 5 to 8; and the s. s. "Westphalia," F. Bornmueller commanding,

in N. 49° 28', W. 24° 42', barometer 28.6 (726.4), wind ssw., force 7.

On the 28th the disturbance was at some distance off the northwest coast of Ireland, the pressure having increased to 29.2 (741.7).

XII.—This disturbance appeared south of Newfoundland on the 29th, and was probably identical with a slight depression which passed to the eastward over the Gulf of Saint Lawrence on the 28th. The s. s. "Neckar," R. Bussius commanding, reported, in N. 44° 03', W. 52° 08', barometer 29.39 (746.5), wind w. to se., force 3 to 7; the s. s. "Waesland," H. Nickels commanding, reported, in N. 45° 55', W. 49° 34', barometer 29.58 (751.3), wind se., force 6, raining. Captain Sadler, of the s. s. "State of Indiana," in N. 44° 27', W. 56° 58', reported barometer 29.6 (751.8), wind u., force 7.

Vessels in N. 49°, W. 52° and 54°, reported strong e. and se. gales. On the 30th the region of least pressure was transferred to about N. 50°, W. 40°, where the barometer ranged from 29.7 (754.4) to 29.84 (757.9), with moderate to strong s. winds to the eastward, and moderate n. and nw. winds in the rear of the depression.

XIII.—This depression appears to have occupied the region between Madeira and the Western Islands from the 27th to the 30th. Owing to the small number of reports received from that region, its origin and subsequent track cannot, as yet, be defined. The following reports, however, are given as showing the existence of the disturbance: s. s. "Weser," H. Bruns commanding, in N. 30° 00', W. 34° 45', on the 27th, barometer 30.03 (762.7), being a fall of .15 inch since last observation, wind shifting from sse., force 3, to nw., force 5, squally. S. s. "Burswell," J. Wallace commanding, in N. 35° 59', W. 18° 25', on the 28th, barometer 29.79 (756.7), a fall of .3 inch, wind sw., force 4, stormy weather; 29th, in N. 35° 42', W. 21° 50', barometer 29.61 (751.8), wind s., force 4, very stormy; 30th, in N. 35° 16', W. 25° 36', barometer 29.7 (754.4), wind ese., force 3, squally. The s. s. "Ohio," G. Meyer commanding, on the 29th, in N. 39° 06', W. 18° 15', reported barometer 29.84 (757.9), wind sse., force 7; 30th, in N. 37° 14', W. 22° 49', barometer 29.89 (759.2), wind se., force 4. Both the "Burswell" and "Ohio" had heavy rain during the 29th and 30th.

TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

In the first column of the following table are shown the normal temperatures of November in the several districts, as determined from the Signal Service records; the second column shows the mean temperature of November, 1883, and the third column shows the departures of November, 1883, from the normal:

Average Temperatures for November, 1883.

| Districts. | Average for November. Signal-Service observations. | | Comparison of Nov., 1883, with the average for several years. |
|-------------------------------|---|-----------|--|
| | For several years. | For 1883. | |
| New England..... | 39.9 | 42.7 | 2.8 above. |
| Middle Atlantic states..... | 45.3 | 48.0 | 2.7 above. |
| South Atlantic states..... | 54.9 | 56.9 | 2.0 above. |
| Florida peninsula..... | 66.8 | 68.0 | 1.2 above. |
| Eastern Gulf..... | 55.6 | 58.2 | 2.6 above. |
| Western Gulf..... | 59.1 | 60.2 | 1.1 above. |
| Rio Grande valley..... | 68.0 | 68.8 | 0.8 above. |
| Tennessee..... | 48.7 | 52.2 | 3.5 above. |
| Ohio valley..... | 43.0 | 47.0 | 4.0 above. |
| Lower lakes..... | 37.4 | 41.0 | 3.6 above. |
| Upper lakes..... | 33.5 | 35.8 | 2.3 above. |
| Extreme northwest..... | 23.8 | 24.0 | 0.2 above. |
| Upper Mississippi valley..... | 38.0 | 41.8 | 3.8 above. |
| Missouri valley..... | 34.8 | 37.1 | 2.3 above. |
| Northern plateau..... | 29.6 | 32.6 | 3.0 above. |
| Middle slope..... | 37.1 | 44.7 | 7.6 above. |
| Southern slope..... | 51.8 | 54.0 | 2.2 above. |
| Northern plateau..... | 42.7 | 47.9 | 5.2 above. |
| Southern plateau..... | 46.5 | 47.9 | 1.4 above. |
| North Pacific..... | 43.6 | 45.9 | 2.3 above. |
| Middle Pacific..... | 53.8 | 51.5 | 2.3 below. |
| South Pacific..... | 57.8 | 58.9 | 1.1 above. |
| Mount Washington, N. H..... | 16.5 | 19.5 | 3.0 above. |
| Pike's Peak, Colo..... | 10.3 | 13.8 | 3.5 above. |
| Salt Lake City, Utah..... | 37.4 | 39.0 | 1.6 above. |

The distribution of mean temperature over the United States and Canada for the month of November, 1883, is exhibited on chart iii. by the dotted isothermal lines.

The general distribution of mean temperature, with the districts of maximum departures from the normal, for the month of November in each year, from 1873 to 1882, inclusive, are as follows:

| Districts. | Maximum departures. | Year. | Remarks. |
|---------------------------------|------------------------|---------|--|
| New England..... | -7.0 | 1873... | Normal in the Gulf states and in the lower Missouri and lower Mississippi valleys; below the normal in all other districts east of the Rocky mountains. |
| Minnesota..... | -5.5 | | |
| Lower lakes..... | -4.5 | | |
| Middle Atlantic states..... | -4.0 | | |
| Gulf states..... | +4.8 | 1874... | Normal in New England and in the lower Missouri valley; below the normal on the Pacific coast, in Minnesota, and in the Saint Lawrence valley; above the normal in the lake region, the upper Mississippi and Ohio valleys, and in the middle and south Atlantic states. |
| Ohio valley and Tennessee..... | +3.9 | | |
| South Atlantic states..... | +1.8 | | |
| Minnesota..... | -2.3 | | |
| Saint Lawrence valley..... | -1.3 | | |
| Pacific coast..... | -0.7 | 1875... | Above the normal on the Pacific coast, in the Ohio valley, south Atlantic, and east Gulf states; below the normal over the northern districts from the Missouri valley to New England. |
| Gulf states..... | +5.7 | | |
| Ohio valley and Tennessee..... | +2.6 | | |
| Saint Lawrence valley..... | +6.0 | | |
| Minnesota..... | -5.3 | | |
| New England..... | -5.2 | 1876... | Normal in the upper Mississippi valley; above the normal on the Pacific coast, in the lake region, Saint Lawrence and Ohio valleys, New England and the middle Atlantic states; below the normal in the Missouri valley and in the south Atlantic and Gulf states. |
| Lower lakes..... | +3.1 | | |
| Saint Lawrence valley..... | +2.5 | | |
| Upper lakes..... | +2.3 | | |
| Middle Atlantic states..... | +2.3 | | |
| Missouri valley..... | -4.5 | | |
| Minnesota..... | -2.8 | 1877... | Above the normal on the Pacific coast and in all districts east of the Rocky mountains, except in the Gulf states. |
| Minnesota..... | +6.3 | | |
| New England..... | +6.1 | | |
| Lower lakes..... | +5.1 | | |
| Middle Atlantic states..... | +5.1 | | |
| Gulf states..... | -2.3 | 1878... | Normal on the Pacific coast; above the normal in all districts east of the Rocky mountains, the departures in the south Atlantic and Gulf states being less than 1°. |
| Upper Missouri valley..... | +13.7 | | |
| Minnesota..... | +12.4 | | |
| Upper Mississippi valley..... | +7.8 | | |
| Missouri valley..... | +7.0 | | |
| Upper lakes..... | +6.0 | | |
| Western Gulf..... | +5.1 | 1879... | Below the normal west of the Rocky mountains and in the Canadian Maritime Provinces; above the normal in all other districts. |
| Ohio valley and Tennessee..... | +4.6 | | |
| Eastern Gulf..... | +3.8 | | |
| Boise City, Idaho..... | -4.8 | | |
| Salt Lake City, Utah..... | -3.2 | | |
| Canadian Maritime stations..... | -2.3 | | |
| Rio Grande valley..... | -12.4 | 1880... | Below the normal over the entire country, the departures being least in the Atlantic coast districts. |
| Middle slope..... | -12.2 | | |
| Southern slope..... | -11.2 | | |
| Northern plateau..... | -8.1 | | |
| Upper Mississippi valley..... | -7.5 | | |
| Florida peninsula..... | +5.6 | 1881... | Normal in the west Gulf states; below the normal west of the Rocky mountains, in the northern and middle slopes, Rio Grande valley, and Minnesota; above the normal in the Missouri valley and in all districts east of the Mississippi river. |
| South Atlantic states..... | +3.2 | | |
| Ohio valley..... | +3.2 | | |
| Salt Lake City, Utah..... | -4.5 | | |
| Middle Pacific coast..... | -2.4 | | |
| Upper Mississippi valley..... | +4.6 | 1882... | Below the normal on the Atlantic and Pacific coasts and in the northern and middle plateau districts; above the normal in all other parts of the country. |
| Upper lakes..... | +4.3 | | |
| Extreme northwest..... | +4.1 | | |
| Northern plateau..... | -4.4 | | |
| Middle Pacific coast..... | -2.3 | | |

The mean temperature of November, 1883, has been above the normal of the corresponding month in all parts of the United States, except in the middle Pacific coast region, where it averaged 2° 3 below the normal. The most marked departures occurred in the middle slope and northern plateau, where they amounted to 7° 6 and 7° 3, respectively. In the western Gulf states, Ohio valley, and lower lake region, the departures varied from 4° 1 in the first named district to 4° 3 in the Ohio valley. In the extreme northwest the mean temperature was nearly normal, the departure being but 0° 2 above, and in the Florida peninsula it averaged 1° 2 above. In the other districts east of the Rocky mountains the departures above the normal temperature varied from 2° to 3° 8. In the northern and southern Pacific coast regions and in the middle and southern plateau districts the departures ranged from 1° 1 to 2° 3. On the summits of Mount Washington, New Hampshire, and Pike's Peak, Colorado, the mean temperatures were 3° 0 and 3° 5 above the normal, respectively. At Salt Lake City, Utah, the